

Brinkman, Alfred Henry (1873-1945)

Herb. received 1922

includes ca. 215 bryophytes, some
identified by G. B. Kaiser.

Herb. Bryologist 49: 1-3. 1946

Note - he collected and sold plants,
mostly bryophytes, from British
Columbia. There were printed
list. Have we any?

Canadian Hepatics by A. Brinkman.

Bowling Lake

Alberta
Canada

- Marchantia polymorpha*, L
Marsupella emarginata, (Schb.) Dum
Lophozia badensis, (Gottsche) Schiffn
· *barbata*, (Schreb.) Dum
paneriana Schiffn
heterocolpa, (Thed.) M. A. Howe
Funzeana, (Huben) Evans
Lycopodioides (Wallr.)
Porphyrolenia, (Nees) Schiffn
Orthaea, (Limpf.) M. A. Howe
· *ventricosa*, (Dicks.) Dum
Sphaerophorus politus, (Nees) Steph
· *scriptus*, (Engl.) Steph
Lophocolea minor, Nees
Chiloscyphus pallidescens, (Goth.) Dum
· *fuliginosus*
· *G. var. villosa*, (Schrad.) Nees
Plepharostoma trichophyllum, (L.) Dum
Ptilidium ciliare, (L.) Nees
· *puberulum*, (Web.) Hünig
Scalla villosa, (Presl) Nees

15 - 6

Brinkman A.
Canadian Hepatics;

ca. 130 Oct 1913

Canadian Hepatic
by Brinkman

(over)

osses from A. Brunkmann recd Feb 1922 inserted in Herb.

<i>Ablystegium compactum</i>	158	<i>Himelypta rhadocarpa</i>	862
<i>filicinum</i>	651	<i>Eurhynchium diversifolium</i>	300
<i>Juratzkianum</i>	175	<i>strigosum</i>	53
<i>Kochii</i>	91	<i>Fissidens subbasilaris</i>	405
<i>riparium</i>	204	<i>grandifrons</i>	343
<i>serpens</i>	395	<i>Fontinalis chrysophylla</i>	247
<i>V. tenue</i>	268	<i>gigantea</i>	140
<i>Ablystegiella subtilis</i>	17	<i>Hindb ergli</i>	444
<i>Andreae petrophila</i>	349	<i>nitida</i>	210
<i>Antitrichia californica</i>	372	<i>neo-exicana</i>	68
<i>curtipendula</i>		<i>Georgia geniculata</i>	192
<i>V. gigantea</i>	373	<i>pellucida</i>	258a
<i>Julacomium palustre</i>	406	<i>Grinnia apocarpa</i>	222
<i>Aphidium Tapponicus</i>	268	<i>V. gracilis</i>	220
<i>Barbula vinealis</i>	268	<i>ovata</i>	350
<i>Bartramia bederi</i>	711	<i>pulvinata</i>	74
<i>Brachythecium albicans</i>	311	<i>tenuicuulis</i>	201
<i>Glareosum</i>	284	<i>yinmostorum curvirostre</i>	281
<i>Bivalve</i>	382	<i>Grinnia torquata</i>	519
<i>rutabulum</i>	7	<i>Hedwigia albicans</i>	123
<i>oxycladon</i>		<i>Imaria Jamesii</i>	50
<i>salesbrosum</i>	333	<i>Hygrohypnum dilatatum</i>	1001
<i>V. turgidum</i>	297	<i>eugyrium</i>	
<i>Bryum affine</i>	264	<i>V. mackayi</i>	780
<i>caespiticium</i>	858	<i>ochraceum</i>	291
<i>capillare</i>	997	<i>palustre</i>	119 & 156
<i>pallens</i>	96	<i>Hypnum reptile</i>	22
<i>pallescens</i>	835	<i>Hylocomium proliiforum</i>	55
<i>turbinatum</i>	688	<i>robustum</i>	296
<i>uliginosum</i>	670	<i>triquetrum</i>	335
<i>ventricosum</i>	775	<i>Leskeia polycarpa</i>	27
<i>Calliergon giganteum</i>	300	<i>Leptobryum filiforme</i>	229
<i>stramineum</i>	277	<i>Leucosia trichodes</i>	362
<i>Camptothecium nevadense</i>	287	<i>Linum hornum</i>	302
<i>pinnatifidum</i>	167	<i>medium</i>	258
<i>nitens</i>	462	<i>punctatum</i>	1614
<i>Campylium chrysophyllum</i>	347	<i>venustum</i>	552
<i>polygamum</i>	716	<i>Leckera tenziesii</i>	374
<i>Catharinae undulata</i>	346	<i>Orthotrichum anomalum</i>	182
<i>Ceabodon purpuratus</i>	281	<i>cupulatum</i>	208
<i>Cinclidium stygium</i>	362	<i>obtusifolium</i>	5
<i>Cladopodium Whippleanum</i>	59	<i>rupestre</i>	269
<i>Climacium dendroides</i>	275	<i>Sturmii</i>	266
<i>Microstomaria cirrhata</i>	225	<i>Paludella squarrosa</i>	438
<i>crispula</i>	976	<i>Philnotis fontana</i>	940
<i>Microstomum Bergeri</i>	391	<i>Polytrichum commune</i>	
<i>bonjeani</i>	168	<i>V. uliginosum</i>	437
<i>fuscoscens</i>	303	<i>juniperinum</i>	
<i>scoparium</i>	393	<i>V. alpinum</i>	225
<i>spurium</i>	448	<i>strictum</i>	226
<i>strictum</i>	160	<i>Pohlia crude</i>	492
<i>undulatum</i>	582	<i>albicans</i>	778
<i>Pistichium capillaceum</i>	57	<i>commutata</i>	772
<i>Mitrichium flexicaule</i>		<i>nutans</i>	203
<i>V. brevifolium</i>	607	<i>Pseudoleskeia atrovirens</i>	218
<i>Propanoecia gracilis</i>	608	<i>radicans</i>	512
<i>q67 aduncus</i>	103	<i>rigescens</i>	276
<i>capillifolius</i>		<i>Terigynandrum filiforme</i>	70
<i>exannulatus</i>	921	<i>Rhacomitrium canescens</i>	567
<i>app V. orthophyllum</i>	926	<i>heterostichum</i>	370
<i>revolvens</i>	283	<i>patens</i>	670
<i>vornicosus</i>	248	<i>Fitilium crista-castrensis</i>	596
<i>uncinatus</i>	387		5

<i>Sphagnum compactum</i>	441
<i>capillaceum</i>	478
<i>Busenii</i>	451
<i>fuscum</i>	592
<i>Girgensohnii</i>	400 & 423✓
<i>magellanicum</i>	595
<i>robustum</i>	257
<i>squarrosum</i>	434
<i>subsecundum</i>	439
<i>Warnstorffii</i>	584
<i>Splachnum sphaericum</i>	249a
<i>Scouleria marginata</i>	256
<i>Scleropodium obtusifolium</i>	89
<i>Scorpidium scorpidicoides</i>	453
<i>Stereodon circinalis</i>	518
<i>cupressiforme</i>	107
" var	164
<i>reptilis</i>	358
<i>Timmia austriaca</i>	144
<i>megapolitana</i>	361
<i>Thuidium abietinum</i>	630
<i>blandovii</i>	280
<i>delicatulum</i>	183
<i>recognitum</i>	132
<i>Tortula ruralis</i>	218
<i>Tortella tortuosa</i>	8
<i>Tayloria lingulata</i>	707
<i>Ulota Americana</i>	12
<i>Bruchii</i>	217

W.M.
1938

188 in all

Brinkman Herb._

A group of 21 specimens of hepatics of the genus Diplophyllum were found in the fungus herbarium and inserted in the General Hepatic Herb. in March 1982. Most of them were collected at Holberg on North Vancouver Island, 1932-37 by a Miss or Mrs Mackenzie (Miss C. E. Mackenzie?).

Brinkman published a paper on this genus in Bryologist 43: 38-45. 1940. I do not find his new taxon, *D. hyalinus*, among the specimens.

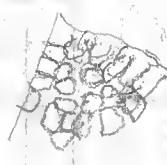
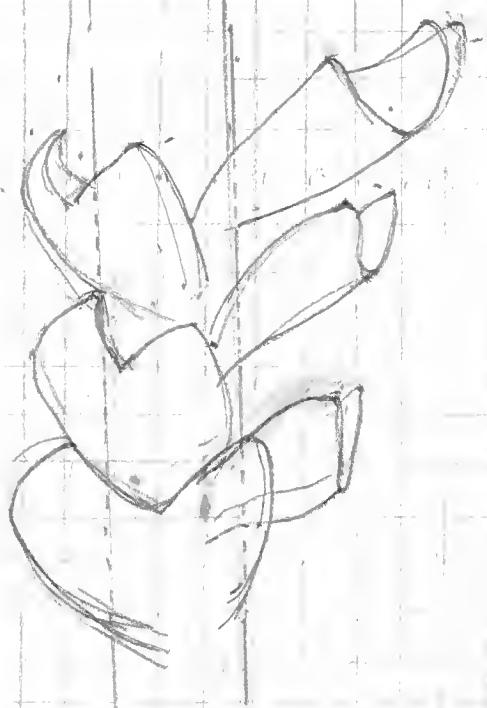
G.S.

NOTES BY MR. BRINKMANN

(to be kept for reference to Brinkmann's specimens)

(specimens are currently being revised by Dr. Bird, (Calgary).

(June 1970, U.H.)





3847. Probably the new *Sphenolobas*.
The *Scapania* one of the *curta* group with
decidedly thickened walls, 154-134

The inner almost as thickened but not rugose
noticed. much like a small *curta* & probably
one of the *curta* group. gemmae bounded
to rounded angular? one cells
inner cells slightly larger wine red
The per of? Spher new less plicate, &
the culm rather longer. The bracts
mostly 3 fid, entire, & acute to apiculate

46 x 1.35 3847a has also the *Scapania*
? *glaucophala*, & has one? bract
4 fid-

3819a. Is good type, as 3864. The perianths
are narrower in proportion. 45 wide x
1.85 long in extreme, there is a greater
range of leaf form. The typical are concave
the sinus can be lunate in the less
concave leaves, while the smaller leaves
may have acute lobes as opposed to the
almost to subacute lobes of the majority
gemmae best forgotten, as they may
belong to *Scapania* al seen under
perianth drots usually 3 lobed, more
seen with teeth

Perianth 1.50 m x 10 mm wide
lobulate, incurved at mouth
cells much as in leaves, but hyaline at mouth
the lobules broadly acute, some ending in
cells 2-4 cells long, lobules & cilia incurved
bracts 2-3 lobed with entire margins, to .8 mm wide
& the leaves beneath larger than those on sterile
stems ^{gemmiferous} from the edges of upper
deformed leaves, spinous read, much as described
for *Hellerianus* but no gemmiferous shoots seen
Perianths may be as close to narrower & cylindrical
with a gradual drawing in towards mouth, &
mark as above all differences between
65 SW mouth seen till about the
nozzle same, lobulate with
Kinosa lobes broadly acute
ending in 1 cell, to a few ending in cilia to 4
cells long
so far differences ~~0.98~~
are not spinous at all for 62
& not spinous dentate bracts ~~0.98~~
& no gemmiferous shoots ~~0.98~~ 51 PB

E 1

2.5

0.98
0.98

0.98
0.98

cells somewhat equally thick walled, irregular in size, but averaging around 17, from 12 to 20
leaves before, lobes equal no ligules
subobtuse, sinus acute, lobes close together
to 4 mm long & almost as wide, graduate in
outline. cells papillose antherodium ^{w. 150} ~~70~~ ⁴ mm
leaves concave cells same base to apex
lobes wide apart sinus acute to subacute
bract & fid entire
leaves often concave & sometimes canaliculate
sinus acute to obtuse, usually somewhat
convex. lobes subacute to obtuse
antheridial bracts more swollen (ventricose) &
more obtuse than ordinary leaves.
perianth mouth crenulate, up to 2 cells
long. leaves subgrade to subtriangular
hairs frequent, long to near apex, hyaline
to dark hyaline. insertion transverse with
no sign of decurrency.

Sphenolobus sp nov

Plants in mats close to the soil, on earth or forest debris, to 3, occasionally to 5 cm long, bent. Dioecious. Leaves approximate to overlapping, somewhat secund. Bifid, broadest about middle, 2.5 to 3 cm long when mature, by 1.5 to 1.8 cm broad. Lobes obtuse to subacute, sinus open, ~~when wet~~ subacute to lunate. usually subacute. Leaves somewhat obliquely inserted, and secund.

Stem with numerous dirty hyaline rhizoids. ~~On~~ ^{rather thick} ~~green~~ leaves none, except rarely one between the bracts. Cell walls firm, but without trigones, chlorophyll showing up rather plainly. Surface papillose, the papillae showing on both surface (looking down thro microscope) and on edge or surface when folded.

1 cells Variable in size, shape and arrangement, averaging around 18 mic. Border cells with a tendency to be quadrate. Very little larger in size below. ~~until near base~~ Anthridial bracts somewhat similar to leaves, but a little larger, and more saccate, the antherids single in the bracts, and large for the size of the plant, averaging 180 mic. Second pair of bracts, a little larger than leaves, but otherwise similar. Bracts variable 2 to 3 fid, ~~occasionally~~ 1 rger than leaves, sharp pointed to apiculate. + Perianth cylindrical to near top, where slightly or more contracted, into short plicae. Avg 1.4 cm long by .6 cm broad. Teeth numerous and coarse, and variable, from 1 to 5 crowded in a single row, or much broader at base, frequently cut ~~into~~ into mouth of perianth.

~~dioecious~~, antheridial bracts terminal on all examined. Young shoots with smaller and more distant leaves, more acute.

Gemmae rare, angular, reddish, irregular in shape, from irregular round to irregular angular. Gemmae deforming tips of upper leaves. Avg 13 mic. (Note, lengths of leaves should be .25 to .3 cm long by .35 to .38 cm broad, shifting the decimal point.)

This sees to cover the common variations.

Type 8864, on forest floor, at Nordegg, Pine Forests. (Alberta) where not rare.

* rarely 4 fid, separate to connate (see fig 1) + margin entire

being found in a number of different places in the district

2 Aug 7 1928

leaves when dry with lobes strongly incurved.

The plant is interesting as forming a link between *Sphenolobus* & *Cephaloziella* and though large for the *Cephaloziella* the shape of perianth & the occasionally partly connate bracts partly bridging the gap between the two genera.

The plant has been confused with *S. Helleri* so the points of distinction are given below.

Affertinus *leath*

Perianth lobulate, with short sharp few in number

Bracts usually 3, fid, rarely over 4, fid
with entire margin, lobes sometimes
operculate, bracts occasionally connate
in pairs

Leaves concave with incurved lobes
lobes subobtuse to subacute, rarely
acute sinus lunata to acute

cells averaging 18, $\sqrt{}$ little of any longer
at base of leaves, irregular & are
& arrangement & rather thick

walled but without trigones

gemmae branches absent

gemmae rarely on margins of upper leaves

Habitat forest floor & floor debris

Millerioides

Perianth lobate with long numerous lobes

Bracts 3, fid (sometimes 4, fid)
with few to numerous teeth

leaves canaliculate teeth subacute and
acute to acuminate lobes, sinus acute

cells averaging 17, very thick
walled, usually much longer at base
of leaves

gemmae branches constant with
reddish tubercular gemmae

Habitat rather moist

phenoloma albertianum sp. nov.

Plants in mats; close to the soil, on forest debris, or more rarely on earth.

Leaves occasionally to 5 in long, bent. Plicates.

Leaves appressed to overlapping, somewhat secund, 3-fld, broadest above middle, .25 to .35 in long, when latitudinal .15 to .20 in broad.

lobes obtuse to subacute, veins open when wet, acute to blunt, mostly subacute. Leaves somewhat obliquely inserted and secund.

Roots with numerous air-phylline rhizoids. Underleaves none, except rarely one between the bracts.

Cells variable in size, shape and arrangement, averaging around 16 mic, until near base, where a few are to 20 by 30 mic. Border cell with a tendency to be sub-palmitate. Surface papillose, the papillae showing on both surfaces (looking down through a diroscope) and on edge or surface when folded.

Cell walls firm, rather thick, but without evident trigones; chlorophyll showing up rather plainly.

Antheridial bracts somewhat similar to leaves, but a little larger, and more separate, the antheridium single in the bracts, and large for the size of the plant, averaging 1.5 mic. Second pair of perichaetial bracts a little larger than the leaves, but otherwise similar.

Bracts variable, mostly 3 fld, occasionally 2 or 4 fld, usually separate, occasionally connate in part (see fig. 1) decidedly larger than the leaves, sharp pointed to apiculate, margin entire.

Perianth cylindrical to near mouth, where slightly or more contracted into short plicae; averaging 1.5 in long by .25 in wide. Teeth numerous and coarse, and variable, from 1 to 5 cells long, in a single row, so (usually) much broader at base. (see fig. 2) frequently cut into mouth of perianth.

Antheridial bracts terminal on all stems examined.

Young shoots with smaller, more distant and more acute leaves.

Type seen on Forest floor near borders in pine forests, (Alberta) where not rare, being found in a number of places in the district.

The plant species is interesting as forming a link between *Sphenolobus* and *Cephaloziciella*, and though large for *Cephaloziciella*, the shape of perianth, and the occasional partly connate bracts partly bridges the gap between the two genera. The plant has been confused with *Sphenolobus "ellerianus*, so the points of difference are given below

<i>S. albertinii</i>	<i>S. "ellerianus</i>
Perianth lobulate with broad teeth and wide	Perianth lobulate with narrow,
short cilia, few in number.	long, cilia
Bracts usually 3 fid, sometimes 2 or 4 fid,	Bracts 2 fid, sometimes 4 fid,
with entire margins, lobes sometimes	with few to numerous teeth
apiculate, bracts occasionally connate	
in part.	
Leaves concave, bilobed, with incurved	Leaves camiculate, bilobed, with
lobes, especially when dry; lobes	acute to acuminate lobes, sinus
subacute to subacute, rarely acute,	acute
sinus lunate to acute	
Cells averaging 16 mic, rather thick walled, walled, irregular in size and arrangement, not much larger till near base, where a few are 20 by 30 mic.	Cells very thick walled, averaging 17 mic, usually much larger at base of leaves
Germose shoots absent	Germose shoots always present, with numerous red tetrahedral bodies
Habitat Forest floor and floor debris	Habitat rotten wood

I am returning Sph. Beller they should have been sent long ago but I felt you would have let me know if you wanted them. I am retaining the new species until published & definitely is not *Hellerianus*. Some of the packets ^{several} were in very small quantity & in a few cases where I could not find what looked like *Hellerianus* with a lens, I left them alone, nearly all should have been examined. You will find notes on some of the packets not enough to characterize. The two European plants, Persson & Arnell, I have picked out from the few, & enclosed them in small packets. I have used them largely for reference along with *mariae*.

1241. C. C. Haynes, Darien Mt. I should say definitely is not *Hellerianus* while it is off type I think it may be just under 3 minutes. It is off type, but 3 minutes is a very variable species, as witness var. *aspiculata* while another var. var. obtuse from new Territories ought to be published. The two packets of Victoria seem practically all *gemesocarpa* no 10 I found one *Hellerianus*, no 2, a few stems no 92. C. C. Haynes, Coll. of H. C. no *Hellerianus* seen but there is a plant apparently new to science. The underleaves separate from *Sphenopholis* or *Diplaptygium*, it seems to come under *Lophozia* perhaps nearest to *hirsutissima* but not very near at what I note inside. I have picked out a few stems & sent to Miss Haynes, & must try to separate out a few again, there seems to be one perianth but as there is only one I have undisturbed. It may not be the new species as the packet is mixed. Went again over the packet trying out the plant with the red gemmae. The plants I examined would seem to come near *L. heterocarpa*, but I found no clear *u* & the gemmae are round to irregular & are distinctly reddish so I put the material back again having failed to find the plant I wanted in the part I examined, & being very uncertain in my mind just what the plant I examined was. I would with considerable hesitation call it *heterocarpa* forma. *longirostris* has somewhat the same form & curvature of leaf but my material is rather greenish than brownish & here again the gemmae don't seem to fit tho the part of *u* I agree with *longirostris*.

I was under the impression I had a letter of yours unanswered, but I cannot find it among my unanswered correspondence. I see from some of your printed material that you have kept yourself very busy, but the tricky *Typhuma* group are almost unrepresented in Canada or in the West, so the paper does not make a direct appeal, while the treatment of *Thysoanthes* must have been an exhaustive one fig 1-5. I take it to be a typical genus. Thank you for the opportunity & privilege of examining the herbarium material of S. *Hellerianus* it helped clear up the point of relationship. Were you ever able to go over the *Asplenium* material & compare with a *coloratum*. It seemed sufficiently different to leave doubts as to its being that species. A most unpleasant winter here & it helps neither work or study but we have to take it. Cincinnati is at least warmer tho they have their blizzards with floods sometimes something that never touches the prairies. The war seems to be stretching its hands widely, taking in botanists also, & one misses them, yet one would hardly wish it otherwise until the war is over, over finished. God grant there is sufficient wisdom & unselfishness to make a lasting peace possible.

If Macrocera figures are taken as a basis for comparison the following points stand out. All the specimens examined here from wood, all had gennariae stems, which however varied in abundance from plenty to very few, so few that considerable examination was necessary to find them. While always the involucral bracts were serrated irregular serrate the figure by Macrocera shows the extreme form from there they varied to forms with fewer or smaller teeth often both, but no bracts were found that were quite entire. Macrocera figures the leaves as equally bilobed 'caminate', acute to acuminate that seemed constant on well formed stems, but it was not unusual to come across deformed specimens where the leaves were very small, as small as a smaller than a small Cypatocella & in such cases there was also a very considerable amount of variation in shape, rarely a few lobes would be obtuse, but the sinus could be acute to obtuse, with almost parallel to wide apart lobes.

Macrocera gives the cells as 16-24, I found them averaging 17 at 2 near apex getting longer near base, where from 20-25. irregular in size & arrangement, & always thick walled, but with no trigone while occasionally genouae sheets were as figured by Macrocera, it was frequently the case that they were with the stem, & below, more like the leaves on ordinary stem his fig 3 of stem does not show the common form here. This occasionally met with, being subacute like the lower leaves stem or fertile stem. The perianth, lobulate & lobed, usually had the teeth extended into awl, up to 8 cells long, but there was considerable variation of this character, some showing fewer & shorter awl, but awl seemed always present, & they seemed to be somewhat blunt & incurved above. The genouae are quite frequently better developed than shown of fig 4 of Macrocera, but attract attention mostly by their bright red colour.

a 137

132a

131a

scandens

2022

128a

longiloba

2211

128b

a

coll.

129a

non var.

(D) var
punctata

25

25 Feb.

longiloba
old stems

Zarenka
plant

714-769

m.v.

forma
oblonga
punctata

714-751

Ros

type

paludosa
var. papillosa

714-

papillosa

goers

late specimen

nordica ♀. 6000 ft. has 5
Loph. longirostris ♂
~~*Loph. longirostris* ♂~~
S. minima ~~angustulus~~ ♂
L. baderensis ♂
L. ventricosa ♂
P. longirostris ♂ P E S A
Loph. Binsteadii ♂ a P E

Jungermannia, N. sp

Autoicous, male bracts some distance below perianth.

Leaves, small below, .35mm, enlarging gradually above till bracts are reached.
-Bracts, .8 wide and .8mm broad.

All broadly ovate, broadest at or below the middle, gradually coming to an obtuse or obtusely pointed apex. Concave.

Insertion, transverse, no distinctly narrower at point of insertion.

Cells, thin walled, but with minute trigones. above averaging 19u, irregular (varying between 13 and 23u) gradually but slowly enlarging towards base of leaf in centre, where averaging 18 by 30u, but on the outside of leaves at base, very little larger than apical cells. Surface verruculose.
Rhizoids, numerous on stems and innovations.

Perianth usually lateral by innovations, from horizontal to suberect, but curved, usually ventricose above ~~at~~ 1.2u long by .75u wide, broadest below to a point about 2/3 of length, where gradually contracting to a small mouth, which is .2u wide, and with numerous crenulations crowded, short to 2 cells long. Upper part of perianth plicate.

The male bracts more concave than the leaves, shallow basin shaped.

Jungermannia, N. Sp

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-Bracts, .8 wide and .8mm broad.

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The male bracts more concave than the leaves, shallow basin shaped.

Utricularia sp. 1 nov

Plants pleurocarpous through meristems in ovations beyond female inflorescence and leaves, arthridial bracts and little distance below perianth.

Plants small, usually under 1 cm long. Leaves frequently subsecund (refer to Macbride's plate of *U. atrovirens*, Pl. 1) but sometimes biplaneate.

Leaves broadly ovate, clasping stem, attaching much as in Figs 1-3 under *U. pleurocarpa*, by midrib, concave, usually largest just below perianths, where up to 1.15 mm long and 1.05 broad, smaller below. Attaching oblique, narrowed to insertion to stem. The leaves broadest below middle, narrowed above to a rounded apex. Cells, apical averaging 19 μ , rather irregular (12-22 μ) in size, somewhat thick walled, with small trigones. Gradually larger below, to 20 μ in centre up to 30 \times 12 μ but at margins distinctly smaller and more isodiametric. Surface verruculose.

Perianths oblique by continuance of innovations; 1.30 mm. long, by .8 mm wide at or about centre, which is swollen to ventricose. Mouth .2 mm wide, deeply plicate, with numerous long ciliated crenulations, 1-2 cells high, base .1 mm. Rhizoids numerous on stems

Type, Canyon Creek, Monte Vista Dam, Placer Co, California, July 11, 1923, Col. G. A. Ladd. In Herb MacFadden

Jungernannia # Sp Nov

Plants pleurocarpous through numerous innovations beyond female in autoicous, anthridial bracts some little distance below perianth.

Plants small, usually under 1 cm long. Leaves frequently subsecond (refer to MacVicars plate of *J. atrovirens*, fig 1) but sometimes biplanteate. Leaves broadly ovate, clasping stem, attachment much as in Figs 1 and 2 under *J. sphaeroearpa*, by MacVicar, concave, usually largest just below perianths, where up to 1.1 mm long and 1.05 broad, smaller below. Attachment oblique, narrowed at insertion to .3 mm: up to .4. The leaves broadest below middle, narrowed above to a rounded apex. Cells, apical averaging 19 u, rather irregular (18-21 u) in size, somewhat thick walled, with small trigones. Gradually larger below, at base in centre up to 30 x 18 u but at margins distinctly smaller and more isodiametric. Surface verruculose.

Perianths oblique by continuance of innovations; 1.30 mm long, by .415 mm wide at or about centre, which is swollen to ventricose. Outr. .17 mm wide deeply plicate, with numerous long celled crenulations, 1-2 cells high, base .3 mm. Rhizoids numerous on stems

Type, Canyon Creek, Monte Vista Dam, Placer Co, California, July 11, 1951,
No. 11. M. J. MacFadden. In Herb MacFadden

Jungermannia N. Sp.

Plants autoicous, branched, usually under 4 cm long
minute.

Leaves smallest below, enlarging upwards. Smallest .35 mm long, usually broader than long, broadly ovate, broadest at or below the middle. Gradually coming to an obtuse apex. Concave. Somewhat obliquely inserted below, but nearly transverse near the perianth, as are also the male bracts. Usually the leaves are subsecund above, ~~much~~ as in MacVicar's plate of *J. atrovirens*. The leaves clasping stem, but not at all decurrent. Cells irregular above averaging 19u, varying from 18 to 22u. somewhat thick walled from contents clinging to walls. Minute trigones present. Basal cells in middle up to 18 by 30u, but not much larger than apical at margins. Surface verruculose.

~~Perianths~~ Rhizoids numerous on stems and innovations, colourless.

Perianth usually lateral by innovations, from horizontal to suberect, ventricose above, 1.3 mm long by .75 mm wide. Broadest at or below middle, plicate from there above, gradually contracted to a narrow mouth .5 mm wide, the mouth with numerous crenulations, short, to 2 cells long.

Male bracts some distance below perianths, deeply concave, and transversely inserted. Bracts below perianth up to 1.1 mm long by 1.05 mm wide, Perianth at base .3 mm wide.

Stem in section with outer row of cells, rather thick walled, 25 x 20u, internal cells thin walled, abruptly differing from outer row. Averaging 15u wide.

^{nearly hyaline} ~~outer~~ ^{cell} walls distinctly verrucose
Type, Canyon Creek, Lono Vista Dam, Placer Co., California June 11th 1920
Coll F A MacFadden, in herb MacFadden.

The continuous innovations give the plant a pleurocarpous character, and the perianths are sometimes curved.

The irregular cells are very similar to those of *J. atrovirens*, to which the plant seems closest in relationship, but that plant is dioecious, ~~while~~ while perianth is ovate to oblong-ovate, but is variable in shape; it however does not appear to have any tendency to approach the shortly-attenuate pointed ^{mouth} of the above. The stem in section shows smaller ^{internal} cells, and while the outer are nearly as large as those of above, the inner are distinctly larger, averaging 20u, and not ^{sharply} marked off from the outer row.

The perianth of *J. pumila* has some approach to that of above, but is more longly attenuate, and less markedly crenulate at mouth, also it is nearly always terminal in appearance, and shows no sign of being ventricose above, being rather fusiform. The leaves are larger, and while the apical cells are not markedly larger, they are less irregular, more noticeably thin walled, and below they are distinctly larger, ^{most} some 50u long, or even longer. The marginal row is rather distinctly marked off.

^{He cells} In stem section the ^{of} *pumila* show but little tendency to differ, and though the outer are larger, 25 x 30, the inner are also larger than above, some 17u, gradually mixing with outer row, not distinctly marked off. They are also distinctly firm walled.

J. Schiffneri has a different perianth, the male bracts are directly below the perianth, the leaves are distinctly different on the infertile branches from the broader than long leaves of the fertile stems.

It has to be remembered however that other of the Californian *Jungermannia* are variable, thus *J. Schiffneri* from there has larger cells than usual, and a longer perianth, though variable perianth is also noticeable from material collected in B.C. and Alberta. *J. pumila* had not the longly attenuate perianth usually found on European material.

J. Bolanderi is distinctly different, and the large decurrent leaves with "upper leaf cells 25-40u, and basal 45-56, will easily pull off from above.

J. manicola is described as perianth obovoid, exserted, irregularly plicate towards the abruptly contracted, at first crenulate-denticulate mouth.

The cell size given is larger also, 24-50u.

J. riparia has larger cells, more ~~thick-walled~~, thin walled, smaller trigones in size and shape; the perianth being however different the mouth is somewhat rougher of the above. It is usually a larger plant

A plant from California, coll E C Sudeliffe, Oct 1927, Plate Flat, Sierra Co, is so near the usual material of *J. atrovirens*, that it appears to fit well enough there to be quoted as an addition for California.

That ^{plant} is at first sight similar to above, but the few perianths found, though immature, or else imperfect, are distinctly different, also the stem section is similar to that of European *J. atrovirens*, and the plant seems dioecious. Male plants found with no ~~antheridial~~ archegonia, and perianth bearing plants showing no sign of antheridial bracts.

Ulmus americana L. var. *macfaddenae*

30 units anticoagulant, 1000 units insulin, 1/2000 units heparin.

Leaves sessile below, enlarging upwards towards the apex. 10-15 mm long, broadly ovate, midrib 2-3 mm below the midrib. Margin nearly entire to the middle apex, otherwise slightly obliquely serrated below, but nearly transverse near the petiole, as are also the male bracts. Usually the leaves are subaequal above, often as in *A. acerifolia* glabrous or with sparse hairs. The leaves clasping stem, but not at all decurrent. Cells irregular above averaging 10 μ , varying, from 6 to 12. 10-15 mm long from contents clinging to walls. Immae decurrent, prominent. Second cells in midrib up to 1.5 by 1.5, but not much longer, others 1.5-2.5 by 1.5-2.5. Surface verruculose.

Additional subject identifiers will be provided on a separate sheet.

Openings, Roads, Bridges and Canals, and the like, will be left.

وَجَدَهُمْ مُّنَاهِنَ لِلْفَلَقِ فَلَمَّا رَأَوْهُمْ أَنْهُمْ مُّنَاهِنَ لِلْفَلَقِ قَالُوا هَذَا

These small cells are very similar to those of a normal eye, but much less numerous and absent in retinopathy, but this varies as the disease progresses and is liable to change, but is variable in degree. The eyes are also liable to have any secondary or associated disease, such as glaucoma, also there are often in retinopathy, changes occurring in the blood vessels, and usually a loss of those of above, the inner and outer artery and vein respectively, and will not infarct out from the outer row.

and granular, and a granular band immediately adjacent to that of shawing, & a dark, heavily granular band across immediately granular at mouth, also at the mouth always dark, but uppermost, pale, shows no sign of being ventricle or above, being rather granular. The surfaces are irregular, while the granules are also irregularly distributed, & the lines irregularly distributed, the wall being dark, & the granules distinctly larger, & the granules larger. The irregular band is rather indistinct at mouth.

12 now section the small but little ceremony on the 12th, in which the other are leading in the little and large and the 20th a small ceremony, finally marking their other newest birthday, upon the 21st, the anniversary of their birth.

Posterior cell elongated and basal 45-50, with easily recognizable lobes. Lateral lobes descending so perianth above all, exserted, the upper 2 lobes almost the abruptly exserted, at first crenulate-dentate, then smooth. The cell size given is larger also, the cell.

or the above

A plant from California, coll. G. C. Muller, Feb 1877, Lake Mattole in Co., is so near the usual material of *A. atrovirens*, that it appears to me well enough there to be quoted as an addition for California. It is at first sight similar to above, but the few perianthes found, though mature, or else imp. feet, are distinctly different, as the strobilus section is similar to that of *A. rostrata* A. Nels., and the plant seems dioecious. - ale plants found with no antheridial archetonia, and perianth bearing plants showing no sign of antheridial bracts.

Jungermannia pygmaea The apical cells are not much differing in size from walled, trigones ^{Knight, Blandovery} minute. The basal cells decidedly larger, up to 60 μ & occasionally beyond. Stem cells 25-30, inner 16-17, firm to thick walled dark-green almost as much ^{dark} coloured as outer either rapidly enlarging. Leaves larger than new & oval not as broad as long perianth longer & narrower, to 2 mm & 75. gradually tapering above to a mouth 1 mm. The cells variable above. Sometimes nearly equal, sometimes unequal, with a rather well defined marginal rim.

Distinctly larger basal cells, large leaves more oval stem structure also different & perianth decidedly different in shape, no signs of ventricose, a seemingly terminal, on all examined

J. alrovensis. Pearson Jones Guen. The cell structure differs but little in size & irregularity from the new one either basal or apical. The leaves may be as broad in proportion. The stem has cells 25-30 visible, 20+ & no marked difference, the plant seems dicoarous. There is considerable variation in leaf size & width & no differences can be laid down as while usually oval they may be on occasions wider than tall & while small below gradually become longer above. The leaves seem decidedly more oblique below than in the new. Plant seems dicoarous what seems like terminal male bracts or an antherid being found

Plate 2, lat. serrata Co. Differing from 8936 in perianth which, while variable show no sign of being ventricose, in stem which has cells not markedly larger the less thick. Sutcliffe 'Sel 1927' walled than in Jones plant & in being? dicoarous. no sign of male bracts. Cells much of alrovensis shape size of leaf & shape variable. immature to overmature perianths. all erect one with lobed mouth immature seems crenulate & one so long as almost to suggest Howe plant.

8936. The cell structure & minute size may suggest *atropurpurea*. The cells are irregular in size & appear thick walled from chlorophyll coloring to them but are really thin walled with minute trigones. The colour is greenish, not blue green & the leaves distinctly wider, usually wider than long, making a flat respect some approach to *J. schiffneri*.

leaves somewhat oblique below nearly transverse above & subsecond cells of perianth slightly larger, avg 21. irregular, thin walled but trigones usual none. cells of stem iso-chametria, avg 30, ^{yellow} green inner stem cells long narrow $\frac{1}{11}$ of dia hyaline, good section. Inner cells avg 15 $\frac{11}{11}$ -20 thin walled, almost hyaline. Outer layer abruptly longer, avg 26, thicker walled, outer layer verrucosae



- 1018 1019 as 1018
19 1020 Differs in leaves from a broader base, with narrower cells more
20 sinuose, the thicker cell walls making the cells appearing still narrower.
21 Infl seems synoicous. inner peristome more appendiculate, outer cells
22 without the well marked projections, of 1019 1019. short necked.
23 Teeth deeper red
24 inner peristome not better developed than 1018
25 Lid seems with a thin series of outside cells 3 rows
26 1021 Lid with a row of elongated cells, annulus not composed of a row
27 of long cells on a row of shorter cells but with a double row of irregular
28 cells, with a row of rather short & somewhat irregular cells.
29 Dioucous, no antherids found in my flowers.
30 Leaves ovate, usually widest at or above the middle, cell rather wide,
31 rather thick walled, border plain, recurved in older leaves, & appressed
32 so as to seem double bordered.
33 Outer peristome bryoid, inner peristome not well seen, outer peristome
34 possibly of few to teeth.
35 1024 Almost pure B Brinkmannii, with a few stems of a pseudo-triquetrum
36 & occasional plants of the other with few stems of B. ("Pseuodotriquetrum")
37 1024 Almost pure B Brinkmannii, with a few stems of a pseudo-triquetrum
38 & occasional stems of B Bulbosum
39 1022 a plant that seems intermediate between pseudo-triquetrum & Brink-
40 manii, with capsule much like latter, but differing in the 5 or more
41 rows of small cells at top of capsule & rather pale teeth compared to
42 one or two rows of small cells in Brinkmannii & very deep red teeth.
43 Wide leaves, large & wide collared, border not as pronounced separates
44 from ordinary triquetrum.
45 a fourth species of ryum al is present
46 1023 *Barbula rubella*
47 1026 seems *Lottia inclinata* but with ? 10 bifid to trifid perforated
48 teeth from a membrane two or three cells high, all coarsely & irregularly
49 papillose or warty, teeth about six cells high, ? broken.
50 1025 mixed with an amblystegium (as 1027), & ?
51 a *Plagiothecium*, with leaves falcate, the falcate portion, crossing the
52 main portion of the leaf, point long but not attenuated, auricles well
53 defined of quadrata, but not hyaline cells, & the bottom cells rather
54 wider & shorter, nerve about third of leaf.
55 1026 *Lottia inclinata* with peristome & spores
56 1027 amblystegium, leaves rather broad & thickwalled, more quadrata at
57 nerve about 1/4 of leaf point rather long & almost straight.

1075 Leaves, thick nerved, upper portion of leaf all n rvc, roughened, coarsely
1078 papillose, lamina, narrow at first, but rapidly expanded at base, net
1079 auricled. Cells irregularly quadrate, rather rapidly narrowing & length-
1086 ening in expanded portion, not papillose. *Swartzia inclinata*
1089 Capsule globose, with 16 double perforated teeth, deep red. 1078
1085 1075

1091 Bryum, leaves narrowly bordered, nerve excurrent, border usually recurved
1090 below. infl. synoicous. capsule, narrow, straight, teeth perfectly bryoid,
with inner peristome well developed, plainly appendiculate.

1073 Bryum, leaves narrow colored with border of narrower cells, plane
or slightly recurved. nerve long excurrent, spinulose, scarcely each
surface cell extruding in a curved point.
capsule sublobose, usually constricted below mouth, surface rough.
teeth irregular inside cell, usual outside cell plates, inner peristome
ciliate & slightly appressed, separate from outer peristome.
infl. ? dioecious, (no antherids found)

1086 Leaves linear-lanceolate, acute, nerve percurrent, or ceasing just below apex
in a few cells. point of leaf serrate. Cells quadrangular, rather pottied,
but with the cells at base long & narrow. Margin plane.

infl. autoicous, with two or more flowers, (up to four)

Cells roughly papillose, papilla ? double, nerve possibly smooth
(mixed with *ottia* ? *inclinata*)

1089 *?Tottia inclinata*. Leaves plane or ? narrowly incurved, with a plain
border of narrower cells, starting near top of leaf & going to bottom of
leaf. Cells slightly papillose. Nerve percurrent, or nearly so, point
abrupt, usually of a few cells. leaf somewhat concave, rather rotund, to
ordinary pottia shape. infl. ? dioecious, capsule without peristome, inclined,
89 85 one ~~row~~ row of small cells below lid. Lid rather long pointed, point
26 inclined.

1085 *Tottia inclinata*. infl. plainly synoicous. Border of leaf seems
narrowly recurved

80 89 1078 Bryum, near 1075. Capsule more lobose, not markedly long, & teeth
red at base, not pale, teeth also markedly aw shaped in like cells,
making ~~inside~~ face seem appendiculate. Lid hamillate.

29 84 56 Nerve smooth or almost so. Leaves usually recurved, at least below, cells
rather wide for Bryum.

57 Differs from 1075 (capsule assymetric) in symmetrical capsule, with
shorter neck, making a small rather wide capsule, but like that in pecu-
liar outgrowths in cells of teeth.

1028 ♂ Same as 1075, immature

1029 *Funaria hygrometrica* with small portion of ryum?

1030 ♂ same as 1027 an *Amblystegium*, but rather larger leaves & more serrate along with a bryum that has rather wide cells & narrow base, with *Leuvalia* habit

1031 possibly *Brachythecium albicans*

1034 seems same as 1027, but in good fruit, synoicous, though antherids & archegions small.

1035 ryum rather wide cells, border of narrow cells, rather narrow. border narrowly recurved from just below apex to base, point excurrent, sometimes percurrent, not longly excurrent, usually slightly serrate at apex of leaf. Leaf widest just above base. Synoicous. Capsule long, with pointed lid : ot a milate, teeth pale, slightly punctate, inner peristome well developed, annulus of two rows of elongated cells, lid with a row of longer cells at margin, border of capsule with two rows of rather smaller incrassate cells.

1032 *Harpidia*, with exannulatum auricles, but entire leaf, no serrations, & very narrow cells. Nerve not up into acumen, slightly plicate, & falcate, not, or not markedly pinnate.

1033 ? same as 1027, but habit as in *Stellatum* group.

1034 ? same as 1035 but with smaller capsule, & point more excurrent, synoicous, inner peristome ? as only parts seen

1035 synoicous, no antherids found, though female plants common. Leaves wide, concave with wide cells, no narrow cells at border, usually plane border. Very small leaves. point rather abrupt from obtuse leaf apex, usually not longly excurrent, often only composed at top of one layer of cells. capsule very small with no neck, peristome perfectly eu-bryum. Thought at first an immature Bryum, but seems perfectly developed.

1036 seems as 1035 but lid about lamilate

1037 Mixture of 6 species. *ariula* topface & *ruberula*, *ryum*,? same as
1038 etc, a *Webera*, a ? *Dicranacea* or *Leptobryum*, & a ? *Orthodontium*.

1038 *lottia* *cimii* & ? dry form of 1032, but with less distinct auricles,
less inflated.

1039 seems good *B. rubella*, with well developed peristome.

1040, *annum* ? *cuspidatum*

1041 *Amblystefium*, in good fruit, seems same as others, but larger leaves,
more widely ovate, cells distinctly narrower, but with some branches
much as the others, & with it another with falcate leaf points, & as nar-
row cells as most narrow of *Amblystegium*, shiny appearance, but not appar-
ently otherwise distinct without fruit. A little *Bryum* ? *pseudo-triquet-
rum*.

1042 ? same plant as last of 1041, but darker, & with the nerve usually
stronger.

& *Bryum* ? *pseudo-triquetrum*, with ovate to widely ovate leaves, wide
cells, sometimes almost quadrate to well past middle of leaf, narrow
border of cells, but variable, at times almost absent, leaf plane to light-
ly recurved to near apex, nerve usually slightly excurrent. ? mucous.

lid seems of double cells, giving it the appearance of tiling, peristome
rather pale, inner peristome seemingly not appendiculate. annulus double
row of rather short cells on narrow border of small incrassate cells.

Capsule gradually, not abruptly bordered with small, not incrassate
cells. Capsule long necked. Apores seem to be markedly larger than
usual with *Bryum*, finely spinlose.

1043 ? *Harpidia* or *Stereodon*, with small but well defined inflated
auricles, excurrent leaves, auricles often torn off, base deeply rounded.

Cells distinctly narrow. Nerve to above the middle, acuminate, falcate,
rather broadly ovate leaves. Also *Bryum* ? *Pseudoatriquetrum* & *Leptobryum*
&

1082 *Amblystegium*, with short nerve, long narrow leaves, usually serrate, cells rather wide, those in corners usually quadrate. A few stems with broader leaves, & rather longer cells, but seems grading into other. a capsule with an areola on it.

1083 *brachythecium*, widely ovate leaves, with few plain quadrate cells at corners, cells fairly narrow, nerve short, leaves & rather long pointed & serrulate. *Amblystegium* as above, a few stems with widely ovate leaves with longer nerve, & short, but somewhat narrow & sinuose.

1084 same as 1078, but not in fruit, with hyaline points, through dryness

1085 *Tharpidia aduncum* V *aquatica*, auricles of that group, & no sign of teeth, long flexuose point, & nerve to about base of acumen

1096 Amb ? *conervioides*, with obscure nerve, short pointed leaves, & cells nearly as wide as long, rather more quadrate at angles, with it a plant with longer & larger leaves, longer cells, more nerve, but seems an Amb, rather serrulate at margins.

1092 & 1093, both with rather wide cells, & teeth seen of usual pattern, not pendulous, ? is air in teeth cause of markings, or possibly membrane markings. Capsule much as 1073, & plants otherwise not much distinct from it, leaves rather wider near middle perhaps

1094 rather larger capsules & showing in some teeth the markings before referred to, at base of teeth, in any case the teeth are not of ordinary construction, being plainly divided into at least two divisions, the cells narrower, but I doubt whether it can be separated from 1075 clearly except when in fruit.

1095 Seems same as 1075, the teeth plainly appendiculate, cells rather narrower than usual, (see remarks above)

1091 & 1090, broadly ovate leaves with strongly serrate, at times spinose teeth, serration to near base usually, cells long but not too narrow, nerve about halfway up, leaves plicate. Fem with long flexuose points.

1099 *Uicranum*, with wide base suddenly contracted about third up to a very narrow & incurved lamina of small obscure quadrate cells.

Below cells long, narrow & hyaline, nerve rather broad. cells above serrate, lamina ceasing below apex, which seems serrate all round strongly curled when dry, flexuose when moist

1100 *Funium* with rostratum leaf, but decurrent, nerve ceasing below apiculus, points very sharp, usually reaching about half way down, unknown

1101 leaves rather broad pointed, serrate to or near to base, nerve to about half way, leaves somewhat plicate, cells rather wide for rachy leaves somewhat decurrent, almost cordate at base with a few rather plain quadrate alar cells reaching almost to nerve. ? *Uicranum*

1044 Bryum, same as 1042. double layered lid & all, but not quite so well marked cells & leaves, & wall cells incrassate, but otherwise same, under mouth of capsule, also a little Leptobryum?, with rather obscure nerve, but bottom small leaves bryoid, with round brown bulbules on roots.

1045 Amblystegium,? same as 1027, & a little of plant ? same as 1033

1046 Barbula rubella

1047 ? dwarfed 1027

1048 ? Amblystegium serpens, nerve strong, to near apex, & broad below, leaves smaller, cells much about same, & P inclinata with good peristome. peristome membrane about 3 cell lines high, & teeth to 8 cells high, bifid to trifid, filiform, but usually variously joined below, densely & closely papillose

1049 Pottia inclinata as a ov. With Amblystegium, (? serpens) as above, & a Bryum with pendulum structure of teeth, small mouth, & conical lid, No inner peristome noticed. Lid double, tiled, annulus cells seem superimposed, from a narrow row of incrassate cells, red. ? double annulus corresponds to double lid. Leaves much of caespiticium type, rather narrow cells, well defined border, revolute to near apex, nerve bent variously, strong, well excurrent, almost smooth

1050 Seems Anium rostratum

1051 C Brachythecium salesbrosum, but leaves rather more widely ovate, not so long a point, & nerve not so strong.

1052 Pottia Heimii & a circinate leaved plant with broad base & plain though usually dark auricles, & rather narrow cells, nerve broad at base but not much above base of point. Also ? Amblystegium

1054 C Pottia inclinata, well developed peristome

1053 B Brachythecium, but shows little if any inner peristome. Lid seems to layered with a third layer ?inside annulus. Annulus two layered from a 1 layer of interrupted incrassate reddish cells.

1055 Pottia inclinata, variable in size & length of capsule seta, size of plant

1056 C perfoliatum, seems same as plant in 1049, with thick bent nerve also a Bryum, one capsule of Bryum shows not pendulum. Hypnum with incrassate quadrate cells gradually at bottom, no marked auricles except

1057 Pottia inclinata, c/pr one with inflated cells hyaline. Circinate

1058 ~~Coratodon~~ Barba rubella & Brachythecium, seems near Barbusum, with very narrow areolation, marked auricles with quadrate pellucid

thickwalled cells.

1059 Brachythecium with wider areolation, rather wider leaves, cells laxer at base, but hardly with auricles, & Coratodon & Leptobryum, with bulbules

1060 Leptobryum & a little bryum with well marked apendicular cilia, & contracted below mouth, leaves hardly recurved, about plain with narrow row of narrow cells to near apex or sometimes not existant, nerve percurrent or slightly excurrent. Also Amblystegium

1061 Amblystecium, with wide incrassate cells, no alar ones, leaves rather falcate, nerve broad but soon disappearing, border of leaf with cells projective, all round.

1062 Seems same as 1059 in fruit Bryum, thick endulum inner cells of peristome, inner peristome not seemingly appendiculate. Leaves broadest just above base, well marked border of narrow cells, closely recurved, so as to seem bistratose, cells fairly broad, point almost smooth, excurrent.

1063 Bryum of Alpinum group, usually wide celled, with almost obtuse leaves & nerve bent & excurrent, with plane margin & no narrow cells, but sometimes nerve slightly excurrent, apex boat shaped, sometimes a border of narrow cells

QFT 1035 ?same as 1063, swamp form, with leaves less appressed, & usually sharper pointed, with narrower cells with often a narrow border, but all these characters are variable, it seems as above. with it an hypnum leaf broadened out from a narrow base, thick nerve, soon vanishing, below apex, point falcate to circinate, alar cells not well marked, but quadrate & incrassate, cells narrow.

1067 as 1063, well marked, with a strong tendency to reddish.

1064 *Funaria*, *Leptobryum*, & a little *Amblystegium* ? *minutissimum*, leaves long lanceolate, ecostate, or faintly nerved, cells fairly long, border of leaves serrate, leaves rather falcate.

1066 *L. rubella* & *Leptobryum*

1068 ? *Amblystegium*, with points often coarsely serrate. Border more or less serrate, cells narrow, no marked auricles, but a few quadrate cells gradually ? adnatum.

1069. ? same as 1076 (?) synoicous, long capsule, border strong, cells wide, leaves widest about or above middle, well appressed, leaves recurved borders. *Ceratodon*, & *Brachythecium*, ? *glareosum*, no auricles, long point, rather twisted & serrate, few quadrate cells gradually at corners, nerve poor, somewhat plicate.

1070 ? *Marbula*. leaf apex very variable, acute or acuminate to broadly obtuse, leaf cells pellucid, very thick walled, base, leaves cells more obscure, or in usually recurved on one or both sides to above centre, never to middle, apex toothed irregularly. nerve always ceasing below apex, leaves crowded on stems, stems tomentose with root hairs well up, cells with a single conical to acute papilla, usually hyaline, at least at apex, giving leaves rather a saw like appearance, nerve also with same kind of papillae. & *Bryum*, same as 1078, young leaves broader, broader cells, margin not so strong & not recurved. & *Brachythecium*, autoicous, with ovate leaves, somewhat serrulate at margin, long pointed, point serrate, nerve less than half way. Cells long & narrow, pellucid, few cells at auricles quadrate, rather plain. rest rather short broad & very long pointed serrate points, male, just as ordinary leaves. & a little *Amblystegium*.

1071 ? same as above, but leaf points more incurved, in fact channeled, & cells seem more projecting, & with it another ?, with narrower cells, leaf broader at above base, but comparatively narrow at base, alar cells more pronounced, little nerve, leaves more licate, edges smooth, also points, nerve seems short & double, on stem leaves, but longer on the narrow deep r plicate branch leaves, autoicous, male bracts from a broad base abruptly & low pointed, seen no paraphyses.

1076 C *Amblystegium*, wide cells, thick walled, entire, short nerved, few more quadrate than rest at angle.

1077 - same, & another harpinioid, with looser more gradually quadrangular cells at base & narrower more sinuose cells rest of leaf, but still broader than second of 1071, & alar cells not so distinct.

1074 seems same as ~~1070~~ 1070, or perhaps as 1071 being more projecting cells at margin.

1072 ? same as 1075, leaves widest at or above middle, cells rather wide, border cells narrow & well defined, recurved to near apex, nerve shortly excurrent, not or but slightly spinose

1073 male flower found, with no sign of archegoniurns, paraphyses plentiful, Also *Ceratodon* with both flowers well developed, some *Amblystegium* in small quantity, *Bryum* leaf broadest near base, cells, rather broad & points not so markedly spinose as thought.

1075 & leaves broadest above middle. little toothed leaf *Amblystegium* & a little *Brachythecium* as 1070

1078 teeth double, sometimes treble perforated, 7 to 10 cells high, cells pitted, giving a very irregular ranking to teeth. leaf of very much expanded, crenate with projecting cells, basal hyaline cells like as *Trichostomum virgineum*

1079 lapillose & inclinate

1080 F *Inclinata*, loose celled form of *L. Nervosa* in small bits of thick nerved ? *Amblystegium*, with strong nerve right up into acumen, acumen more or less channeled, cells rather narrow for the genus, a few at corners gradually more quadrate, cells projecting for some distance up edge of leaf

1081 Mostly *L. Nervosa*, with a st. or two of *L. inclinata*, & a broad celled widely ovate narrow border *bryum*,